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ABSTRACT

Although there has been a substantial decline in cigarette consumption among the adult population in the United States, use of cigarettes among the adolescent population has continued to grow. Since 1993, a disturbing increase in smoking among college students has been observed. This study attempts to reduce public smoking outside classroom buildings by posting paper signs reading "Think...Why Smoke?", designed to make smokers more conscious of their behavior. A paired sample t-test showed that the mean amount of cigarettes smoked on baseline days was significantly higher than the amount of cigarettes consumed on experimental days. Comparison of the number of whole cigarettes smoked outside the buildings during the baseline and experimental weeks showed a 35% reduction. Factors promoting smoking behavior are also discussed. Future research should examine the effects of longer interventions, assess displacement of smoking more completely, and monitor the long-term impact of these types of interventions on student attitudes and smoking behavior. (Contains 3 tables and 34 references.) (Author/MKA)

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Use of a Visual Prompt to Reduce Public Cigarette Smoking on a College Campus

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Abstract

Although there has been a substantial decline in cigarette consumption among the adult population in the US, use of cigarettes among the adolescent population has continued to grow (Price, et al., 1998). Since 1993, a disturbing increase in smoking among college students has been observed (Wechsler, et al., 1998). This study attempted to reduce public smoking outside of classroom buildings by posting paper signs reading "**Think…Why Smoke?**", designed to make smokers more conscious of their behavior. Cigarette butts were collected during a baseline week prior to the posting of signs, and for a week after signs were posted. A paired samples *t*-test showed that the mean amount of cigarettes smoked on baseline days (M=92.33, SD=12.74) was significantly higher than the amount of cigarettes consumed on experimental days (M=59.67, SD=15.50), $t(2)=-4.25$, $p=0.05$. Comparison of the number of whole cigarettes smoked outside the buildings during the baseline and experimental weeks showed a 35% reduction.

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Introduction

Cigarette smoking is recognized to be the largest single preventable cause of death in the United States (Barton, et al., 1982; Compas, et al., 1998; Price, et al., 1998; Wechsler, et al., 1998), causing 400,000 premature deaths annually in the United States (Lewis, et al., 1998). After years of decline, cigarette smoking has made a comeback on many college campuses (Price, et al., 1998; Wechsler, et al., 1998). Despite decades of education programs aimed at alerting young people to the risks associated with smoking, more college students are choosing to engage in the habit, often beginning to smoke after coming to live on campus.

Of particular concern is the apparent shift in norms regarding public smoking outside of classroom buildings. A simple, inexpensive intervention was used to discourage smoking by making smokers in public areas more self-conscious of their habit. By reducing smoking in public areas, it may be possible to restore anti-smoking norms on campuses.

In previous years, most students who smoked in college arrived on campus with the habit. They typically came from families where their parents smoked, and had adopted the habit in middle school or high school in the context of a peer group that smoked socially. In contrast, today many college-age smokers did not smoke prior to leaving home, and have parents that do not smoke (either because they successfully quit, or because they never started the habit). For these students, smoking is a way of defying parental norms and signifying independence. Many confess they start smoking because they felt uncomfortable being the sole nonsmoker in social situations; some even started because the smoke made them feel less sick if they were participating. Others see smoking as a way of managing the stresses associated with college. Most do not see their behavior as placing their health in future jeopardy, because they view this a s a temporary habit that is under their control.

The irony is that while many college students are asserting their right to "experiment" with tobacco in much the same way that many of their parents' "experimented" with marijuana, the stigma associated with cigarette smoking among older adults (age 30 and up) is becoming increasingly pronounced. Students who cavalierly begin smoking do not realize how this decision may have a negative impact on how they are viewed by members of the generation of older adults making professional school and employment decisions. Only 25% of adults now smoke (Compas, et al., 1998), and those who smoke tend to be less economically successful and less well educated. Most of the older adults wielding power over the lives of today's college students do not themselves smoke.

These older adults tend to think of cigarette smokers in very unflattering terms. Having struggled themselves to give up

this habit, watched others struggle, and/or watched others die of smoking-related illnesses, many of these individuals view those who started to smoke after the risks associated with this behavior and second hand smoke were well publicized as careless, unintelligent, and selfish. Prejudice against young smokers is evident in increasing discriminatory hiring practices and adoption of nicotine testing as an employment prerequisite in some states (e.g., the state of Washington). Although such discrimination is being challenged by the ACLU and other groups, the current work environment remains quite hostile to smokers. College students need to be made aware of how, given the current climate, their choice to smoke may jeopardize both their health and their future careers.

While the decision to smoke is a private one, and arguably adult students should have the right to make their own decisions about whether or not to begin this habit, proximity to public smoking may have a subtle but pernicious effect on this ostensibly autonomous decision-making. The social psychology literature is replete with examples of how simple exposure increases affinity for various products and ideas; familiarity breeds fondness (Zajonc, 1968; Brickman and D'Amato, 1975; Moreland and Zajonc, 1982). Considerable research on social influence and the impact of role models (Bandura and Walters, 1963) has established the potential for proximity to smokers to increase the probability of habit adoption.

Social contexts on campus dominated by smokers may therefore increase the likelihood of some students' initiation of this behavior while in college. Most college-age smokers initially do not see themselves as "heavy smokers" in danger of becoming addicted to nicotine. Instead, when challenged, they dismiss their behavior as mere "social smoking", limited to specific situations, such as parties where alcohol is served and others are smoking. Unfortunately, a percentage of these "negligible" smokers will go on to develop dependence on nicotine, and will find it very difficult to reverse their decision.

Although most campuses have adopted smoke-free policies for buildings and residence halls, smoking behavior continues in public areas. Although restricting indoor smoking has been extremely beneficial, acceptance of outdoor smoking in central public areas remains a problem. Public gatherings of students smoking outside of public classroom buildings compel all students to pass through smoke-filled areas on their way to classes. Tolerance of this highly visible, public smoking implicitly condones it. Acceptance of public smoking on campus is potentially problematic because it may increase the likelihood of students' adopting the habit while on campus. This study attempted to reduce public smoking outside of classroom buildings by posting signs designed to make smokers more conscious of their behavior. These signs were developed to counter the implicit pro-smoking message conveyed by gatherings of smokers outside classroom buildings, with a gentle anti-smoking message (Think.

Why smoke?) designed to encourage students to reflect and to consider the anti-smoking attitudes of others. Finding ways of reversing the apparent shift to pro-smoking norms on campuses may ultimately reduce the number of new users on campus, although this study did not attempt to assess this long-term impact.

Factors Promoting Smoking Behavior

Barton and his colleagues (1982) found that the factors motivating adolescents to smoke were quite different from those motivating their adult counterparts. Gibbons and his colleagues (1998) found that adolescent smoking behavior is usually an unintended behavior. Stein and her colleagues (1996) found that smoking among adolescents typically fluctuates, especially between early and late adolescence.

According to Evans and his colleagues (1977), the smoking benefits perceived by the adolescent outweigh the health risk factors. According to Evans, et al., adolescents perceive smoking health risks to be associated with the adult and older population. Early adolescents smoke in order to enhance their social image and to increase peer acceptance (Barton, et al., 1982; Newcomb, et al., 1989; Gibbons, et al., 1998; Erikson, 1963; Stein, 1996; Ouellette & Wood, 1998; Price, et al., 1998). Simmons and his associates (1973) found that early teen smoking often enhances self-image. Since this age period is a time of identification with peer social circles, this age group is motivated to adopt behaviors, such as smoking, to fit in with these social groups and indirectly increase self-esteem. Price and his colleagues (1998) found that the most important factor shaping the increasing use of cigarettes among adolescents remains peer influence and the desire to demonstrate a willingness to take risks. Price and his associates also found that experimentation and occasional cigarette use increases the chance of an individual's becoming a "regular" smoker.

Motivation for smoking among adolescents has been fond to vary as a function of age. Barton and his colleagues (1982) studied 286 sixth graders and 248 tenth graders and evaluated motivating factors that initiated smoking in these two age group. The researchers found that high self-consciousness and low self-esteem correlated with smoking initiation. Each group was presented with a slide depicting a female and male model with and without a cigarette. The researchers assessed the students' perceptions of the smoking versus non-smoking models by asking them to use polar adjective descriptives (ugly /good looking). The sixth graders described the smoking models as tough and wanting to be with the group. Female smoking models were perceived as better looking and more desirable as friends. The tenth graders also viewed the female smoking models as better looking, wanting to be in the group, and more interested in the opposite sex. The researchers concluded that for the sixth grade group, smoking initiation was based on social image factors,

especially the student's identity concept. This motivational factor diminished as the teen matured; tenth grade students were more inclined to smoke to establish an image emphasizing one's interest in the opposite sex. Barton and his colleagues also noted a strong correlation between the intention to smoke and positive view of the target smoker.

Gibbons and his associates (1998) found that when peers engage in smoking behavior and when peers value teens that participate in the behavior, there is an increased risk for initiation of smoking. Erikson (1963) noted that adolescents are "preoccupied with social images and identities- they're own and others." Gibbons and his colleagues concluded that adolescent smoking was a response to social opportunities that arose, and found that availability of cigarettes and willingness to smoke could lead to smoking within the adolescent population, even with little or no prior intention to smoke. Ouellette and Wood (1998) argue that smoking behavior occurs in response to environmental events and that the behavior involves conscious intent to participate in-group behavior. Ajzen (1991) found that intention to smoke is influenced by an individual's logical reasoning skills, attitudes towards the behavior, social pressure and the ease of carrying out the behavior.

Newcomb, McCarthy, and Bentler (1989) investigated smoking involvement, academic lifestyle orientation, emotional well being, social impact efficacy, and peer smoking as a predictor of cigarette use among adolescents. These researchers discovered through confirmatory factor analysis that early adolescent smoking involvement was significantly associated with decreased academic lifestyle orientation, decreased emotional well being, increased early adolescent social impact efficacy, increased peer smoking behavior, and increased young adult smoking. Supporting Newcomb and his colleagues' findings was a study by Hu, Lin, and Keeler, (1998), who studied 5,028 teenagers who completed the California Youth Tobacco Survey. These teenagers were then divided into three groups by smoking status: Current smoker, former smoker and nonsmoker. Analysis of the data showed that the older adolescents were more likely to smoke currently, and that students who performed below average were more often current smokers and less likely to stop smoking. Teenagers from the highest income group ($75,000) were more likely to be former smokers, and below average students with lower household incomes were least likely to quit smoking.

Stein, Newcomb, and Bentler (1996) performed a longitudinal study of 133 men and 328 females, who were recruited in junior high school, and assessed personality traits associated with adolescent smoking and continuation of smoking into young adulthood. The researchers found that early adolescent smoking was positively correlated with cheerfulness, more socialization with peers, and extroversion. As the group was reevaluated across time, the researchers discovered changes in the positive qualities associated with smoking. Four years after the study

began, cigarette use and depression were positively correlated and cigarette use was negatively correlated with good social relations and minimally correlated with extroversion. These correlations were consistent and substantial as the study progressed over thirteen years. Stein and her colleagues concluded that early smokers initiate smoking for social factors (peer identification) and that those who continue to smoke into adulthood do so for emotional reasons (relief from stress).

Ouellette and Wood (1998) defined a habit as a routine way of behaving, even if the habit is senseless or may have harmful effects on the individual. They found a relationship between habit and automaticity; the habit of smoking can develop with repetition and practice in particular situations. The initiation of smoking behavior becomes automatic and requires little attention or thought, and can be performed in adjunct with other activities (Posner & Snyder, 1975; Schneider & Shiffrin, 1977). Once an adolescent has initiated and formed the habit of smoking, addiction to nicotine can result. This addiction strongly deters a smoker from ceasing smoking behavior. Piasecki, et al. (1998) found that withdrawal symptoms significantly influence cigarette dependence and relapse following attempts at cessation. Withdrawal symptoms associated with smoking cessation include urge/cravings, irritability, difficulty concentrating, anxiety, depression/dysphoria, impatience, sleeping disturbances and hunger. The manifestations of these symptoms are at the highest point during the first week of smoking cessation and abate within one to four weeks; individuals who smoke reported withdrawal symptoms as a major obstacle to abstinence (Cummings, Giovino, Jaen, & Emrich, 1985). Piasecki, Fiore, and Baker (1998) discovered that those individuals who had an atypical course of nicotine withdrawal (showing symptoms that continue or are intensified after the standard withdrawal period) are at high risk for relapse if they begin a smoking cessation program. The researchers also found that onset of withdrawal symptoms is enough to motivate individuals attempting to cease the behavior to begin smoking again.

Sadly, researchers have repeatedly observed that smoking intervention programs have very modest effects on immediate and long-term abstinence rates (Price, et al., 1998). Smoking cessation programs have positive effects up to the first six months of treatment, but then the rates of relapse start to become manifest (Wilson, et al., 1990; Becona, et al., 1998; Rosal, et al., 1998). After participation in any given smoking cessation program, the rate of relapse at one year following the program varies from sixty to ninety percent (Becona, et al., 1998; Lewis, et al., 1998; Rosal, et al., 1998; Piasecki, et al., 1998; Compas, et al., 1998).

Baseline Procedure

On the Friday preceding the start of the baseline observations, the designated smoking area outside of three large smoke-free public classroom buildings on a small college campus were cleared of all cigarette butts. This designated area was defined by a ten-foot radius originating at the center of the main entrance to the buildings, where ashtray receptables were located. During the week of the baseline observations, buildings were visited in a standardized order between the hours of five and six o'clock in the evening. At this time, researchers collected cigarette butts from all of the designated areas. This occurred daily from Monday through Thursday during one week in early April. The number of butts was recorded in terms of length of remaining cigarette, in order to permit calculation of the number of whole cigarette equivalents smoked, as well as the simple number of butts left in the designated area.

Experimental Procedure

The designated smoking area for each building was again cleared of cigarette butts on the Friday prior to the experimental manipulation. In addition, signs reading "**Think...Why Smoke?**" were placed near the doorway of the smoke-free public buildings. Researchers consistently visited these sites between five and six o'clock in the evening to collect cigarette butts on Monday through Thursday. After counting the number of cigarette butts, they were tallied and measured using the aforementioned method.

Cigarette butts were also collected at one student residence site, in order to provide an informal estimate of whether the posting of signs around the public building sites actually reduced outdoor smoking or merely displaced this behavior.

Data Manipulation

Cigarette butts counted were broken into five categories: full cigarette left, three-quarters left, half left, one-quarter left, and only filter left. Using the tally sheet, the total numbers of cigarettes found at each site were entered according to the length. In order to calculate daily whole cigarettes smoked equivalents, the number of cigarette butts were weighted on a scale from 0.25 to 1.0. (cigarettes with three-quarters left were multiplied by 0.25.; those where half a cigarette was left were multiplied by 0.5; one-quarter of a cigarette left was weighted 0.75; when cigarettes were fully smoked, they were counted as 1.0.) No full cigarettes were found. A simple count of unweighted butts was also made.

Table 1

Total Number of Cigarettes Smoked Daily at Public Sites

	Mean	N	S.D.
Baseline Week	92.33	3	12.74
Sign Week	59.67	3	15.50

Table 2

Total Cigarettes Smoked (Adjusted) PRE-POST

Mean	Std. Deviation	t	df	p
32.67	13.32	4.25	2	.05

Table 3

Total Cigarette Butts (Non-Adjusted) PRE-POST

Mean	Std. Deviation	t	df	p
36.67	13.58	4.68	2	.04

Results

A paired samples *t*-test was conducted to determine whether there was a difference in the amount of whole cigarettes smoked during baseline days and on the days after signs were placed outside of academic buildings. Table 1 and Table 2 show the results of this analysis. The mean amount of cigarettes smoked on baseline days (M=92.33, SD=12.74) was significantly higher than the amount of cigarettes consumed on experimental days (M=59.67, SD=15.50; $t(2)$=4.25, p=.05). When the mean number of whole cigarettes smoked outside the buildings during the baseline week was compared with the mean number of whole cigarettes smoked outside the buildings during the intervention week, a 35% reduction was observed.

A second paired samples *t*-test was conducted on the unadjusted measure of cigarettes smoked (simple number of

the sign intervention. Table 3 shows the results of this analysis. The number of butts collected on baseline days was significantly higher than the number of butts collected on sign days ($t(2)=4.68$, $p=.04$).

As an informal check on whether the signs were actually reducing smoking behavior or merely displacing it, the number of cigarette butts left at a representative student residence hall was counted. The mean daily number of butts collected during the week prior to the intervention was 57, and the mean number collected on days during the intervention week was 78. When length of cigarette butt was taken into account in order to permit an estiamtion of the number of whole cigarettes smoked, the baseline daily number of whole cigarettes smoked was 51 and the number of whole cigarettes smoked during days of the intervention week was 58.

Discussion

There is no way of knowing whether this intervention actually reduced smoking or simply motivated smokers to relocate elsewhere. Inferred observations after the experimental period revealed no obvious development of alternative smoking sites. This intervention may have made smokers more self-conscious, and therefore encouraged them to avoid smoking in public places. While it would be most desirable to motivate them to refrain from smoking entirely, even just reducing public smoking may have a positive impact on campus norms.

This shift from public smoking could be a move in the positive direction for several reasons. It appears that smokers were affected by the signs; even if thoughts lasted only for the few minute walks to their rooms, some effect seems to have reached the smokers. This decrease in amount of cigarettes consumed over a one-week period is beneficial to the non-smokers on campus. With a decrease in smoking, there is less of annoyance upon entering these academic buildings; they do not have to worry about walking through smoke to get to class. For future studies, a longer baseline period may yield results that better mirror the pattern of campus smokers. Because the campus studied is small, a larger number of buildings may be needed as campus size increases.

Review of the data collected at the residential site presents an ambiguous picture. The adjusted (whole cigarettes) measure indicated a trivial increase in the number of cigarettes smoked during the intervention week. On the other hand, the nonadjusted measure (simple number of butts) showed an increase during the period that signs had been posted. While smoking behavior decreased outside the public classroom sites following the posting of the signs, the one residential site that was monitored showed an increase in smoking on the nonadjusted

measure. This suggests that rather than simply reducing smoking behavior, posting of signs outside of public buildings may have reduced smoking for some, but led other students to relocate their smoking to a less public venue.

Although the experimental intervention was designed to discourage smoking, given the typical persistence of this habit, one week's exposure to the sign's message was not necessarily expected to motivate smokers to quit entirely. Although less desirable than cessation, relocating smoking to less public and less visible campus locations can be viewed as potentially beneficial, because of its potential effect on campus norms. Future research should examine the effects of longer interventions, assess displacement of smoking more completely, and monitor the long-term impact of these types of interventions on student attitudes and smoking behavior.

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